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ABSTRACT

A three-year study evaluated the cognitive and affective effect of computer-assisted instruction (CAI) on adult basic education (ABE) students at the Great Neck Adult Learning Centers. The system was used by learning laboratory students in 1977 and by both learning laboratory and classroom students from 1977-1979. The 100 students enrolled from 1978-1979 used CAI regularly as a core part of their study. The curriculum in the drill and practice program consisted of Adult Reading Skills, Adult Arithmetic Skills, and Adult Language Skills I and II. It was based on mastery learning and ranged in level from third through seventh grade. The study used an experimental-control group design containing three elements: (1) comparison of growth on California Achievement Test in reading and mathematics, (2) comparison of time spent in program, and (3) examination of students' attitudes toward learning and use of CAI. Staff and student reactions concerning use were uniformly positive. Third-year and three-year studies' results confirmed that use of CAI led to significant cognitive and affective growth. In structure and design CAI seemed an effective supplementary learning medium for ABE students. Changes were indicated in curriculum scope and system capability. (An analytical summary precedes the general report.) (YLB)

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FINAL THREE YEAR REPORT

(2/77-6/79)

PILOT PROJECT

IN

COMPUTER ASSISTED INSTRUCTION

FOR

ADULT BASIC EDUCATION STUDENTS

ADULT LEARNING CENTERS, THE ADULT PROGRAM

GREAT NECK PUBLIC SCHOOLS, GREAT NECK, N.Y.

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DEDICATION

DEEPEST APPRECIATION IS EXPRESSED TO MR. NEIL W. CARR, SUPERVISOR, UNIT OF BASIC CONTINUING EDUCATION, DIVISION OF CONTINUING EDUCATION, NEW YORK STATE EDUCATION DEPARTMENT, FOR HIS DIRECTION AND SUPPORT OF THIS PILOT PROJECT IN COMPUTER ASSISTED INSTRUCTION.

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The Administration and Staff of the Great Neck Adult Learning Centers constantly strive to provide quality instruction for the youth and adults of the community.

The conceptualization, design and implementation of this pilot project in Computer Assisted Instruction utilized a wide range of experts.

NEW YORK STATE EDUCATION DEPARTMENT

Mr. Gerald L. Freebourne, Assistant Commissioner, Occupational and Continuing Education.
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Mr. Neil W. Carr, Supervisor, Unit of Basic Continuing Education.
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Dr. J. Robert Rosenthal, President, Board of Education.
Mr. Jay Waxenberg, Director of Special Services.
Dr. David Rauch, Director of Adult Education.

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ADULT LEARNING CENTERS

Mr. Peter Johnston, Project Coordinator.
Mrs. Andree Franklin, Project Aide.
Mr. John Caffera, Media Specialist.
Mrs. Marie Heath, Learning Laboratory Supervisor.

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SUPPLIERS OF COMPUTER HARDWARE AND SOFTWARE

Instructional Systems, Inc., Englewood, New Jersey.
Computer Curriculum Corp., Palo Alto, California

TABLE OF CONTENTS

	Page(s)
Funding Acknowledgement	i
Dedication	ii
Acknowledgements	iii
Table of Contents	iv
PART I - ANALYTICAL SUMMARY	
Overview	1a
History of the Project	1a
Current Study - 78/79	1a
Computer Assisted Instruction (CAI): What Is It?	2a
Computer Assisted Instruction Curriculum	2a
CAI Student/System Operating Procedures	2a
Staffing	3a
Evaluation Design	3a
Staff/Student Reactions	3a
Matched Objectives and Outcomes 78/79	4a
Conclusions and Recommendations	5a
PART II - GENERAL REPORT	
Overview of Adult Learning Centers	1
History of the Project	2-3
Computer Assisted Instruction (CAI): What Is It?	4
The Curriculum: Its Nature and Forms	4-6
CAI Student/System Operating Procedures	7
Staffing	8-10
Objectives of Study	11
Evaluation Design	12-14
Matched Objectives and Outcomes:Current Study 78/79	15
Matched Objectives and Outcomes: Three Year Study 77-77/78	16
Findings	17-27
Three Year Cognitive Findings	28-29
Three Year Affective Findings	30
Staff/Student Reactions	31
Conclusions and Recommendations	32-34
PART III - APPENDIX	
Appendix #1 - Adult Reading Skills	35
Appendix #2 - Adult Arithmetic Skills	36
Appendix #3 - Adult Language Skills	37
Appendix #4 - Outline of Discussion Questions	38
Appendix #5 - Semantic Differential	39-44

PART I

ANALYTICAL SUMMARY

Part I Analytical Summary

For More Details See Page

Significant Findings of This Project

Overview 1

The Great Neck Adult Learning Centers offer a variety of services for the educationally disadvantaged adult. Programs are offered in English as a Second Language (ESL), Basic Education and High School Equivalency preparation. Instruction takes place within both individualized learning laboratories and group instructional classroom settings. In addition, vocational and educational counseling services are also offered.

The Adult Learning Centers introduced Computer Assisted Instruction (CAI) into its instructional program in order to promote greater cognitive and affective growth. A three year study has been implemented to evaluate the effectiveness of Computer Assisted Instruction with Adult Basic Education students.

History of the Project 2

In February 1977, Computer Assisted Instruction was introduced to the Great Neck Adult Learning Centers. Sixty Adult Basic Education Learning Laboratory students utilized the system during its first four months of use as part of their study of reading, mathematics and language.

The results were so positive that the project was extended to the 1977-78 academic year and expanded to include Adult Basic Education students studying within group instructional classroom settings. Thus, the system was utilized by a combined total of ninety-nine learning laboratory and classroom students.

Current Study - 1978-79 3

During the nine month period from mid-September 1978 to mid-June 1979, fifty Adult Basic Education learning laboratory and fifty Adult Basic Education classroom students utilized Computer Assisted Instruction regularly as a core part of their study of reading, mathematics and language.

Of these one hundred students, sixty-seven were women and thirty-three were men. These students ranged in age from 17 to 79 and possessed reading skills ranging between the third and seventh grade level.

Significant Findings of This Project (continued)

For More Details See Page

Computer Assisted Instruction (CAI)-What Is It? 4

Computer Assisted Instruction is a computer/video display terminal system that incorporates programmed instructional materials and is used as a supplementary learning tool for students from both classroom and learning laboratory educational settings.

The Computer Assisted Instruction system utilizes the powers of the computer to:

1. Diagnose skill areas in need of improvement.
2. Present individually appropriate material designed to improve and reinforce skills.
3. Maintain detailed records of the student's progress through the programmed curriculum.

Computer Assisted Instruction Curriculum 4-6

The Computer Curriculum Corporation's Adult Basic Education drill and practice program consists of four Adult Skills courses entitled:

... Adult Reading Skills
... Adult Arithmetic Skills
... Adult Language Skills I
... Adult Language Skills II

The curriculum is based on mastery learning and ranges in level from third to seventh grade.

Computer Assisted Instruction Student/System Operating Procedures 7

All students receive Computer Assisted Instruction lessons by means of one of six video terminals. The computer presents appropriate material to the student and then provides immediate feedback to the student's response.

The system automatically moves students to more difficult or easier material according to the student's performance. At the end of each lesson, it provides both student and teacher with a detailed diagnostic summary of the student's performance.

Significant Findings of This Project (continued)

For More Details
See Page

Staffing

8-10

The Computer Assisted Instructional staff consists of a Project Coordinator and a Project Aide. They, along with the Great Neck Adult Learning Centers Media Specialist, have primary responsibility for Computer Assisted Instruction. In addition, the entire Learning Laboratory staff has been oriented to the system's operation and is competent in all aspects of its use.

Evaluation Design

12-14

This study was designed to generate insight on the effect, both cognitive and affective, of Computer Assisted Instruction on Adult Basic Education students. The study included Experimental Groups made up of students who made regular use of Computer Assisted Instruction and Control Groups made up of students who did not have access to Computer Assisted Instruction. There have been slight variations in the evaluation design for each of the three years. However, each study has contained the comparative and non-comparative elements listed below.

1. Comparison of growth on the California Achievement Test in reading and mathematics for the Experimental and Control Groups.

2. Comparison of time spent in the program by the Experimental and Control Groups.

3. Examination of students' attitudes towards learning and towards the use of Computer Assisted Instruction.

Staff/Student Reactions

31

Student and staff reactions concerning the use of Computer Assisted Instruction were uniformly positive. Students find that their speed and ability to concentrate improve. They are very aware of both the progress they make through the Computer Assisted Instruction system and of their improvement in specific skill areas.

Staff find the reporting system helpful for ongoing diagnosis and feel that the individualized nature of Computer Assisted Instruction makes students more independent and more open to new modes of instruction.

Significant Findings of This Project (continued)

For More Details
See Page
11,15,16
17-30

Matched Objectives and Outcomes 78/79

Objectives	Outcomes
Cognitive	
Learning Laboratory students using CAI (Experimental Group) will exhibit greater cognitive growth in reading and mathematics than Learning Laboratory students not using CAI (Control Group) and Adult Basic Education students statewide.	Learning Laboratory students using CAI (Experimental Group) showed much greater cognitive growth in reading and mathematics than Learning Laboratory students not using CAI (Control Group) and Adult Basic Education students statewide. Lab Exp. / Lab.Cont. / ABE Statewide Reading 2.81 / 2.11 / 1.40 Math 2.80 / 2.19 / 1.40
Classroom students using CAI (Experimental Group) will exhibit greater cognitive growth in reading than Classroom students not using CAI (Control Group) and Adult Basic Education students statewide.	Classroom students using CAI (Experimental Group) showed much greater cognitive growth in reading than Classroom students not using CAI (Control Group) and Adult Basic Education students statewide. Class Exp. / Class Cont. / ABE Statewide Reading 2.63 / 1.79 / 1.40
Affective	
Learning Laboratory students using CAI (Experimental Group) will establish more sustained contact than Learning Laboratory students not using CAI (Control Group).	Learning Laboratory students using CAI (Experimental Group) spent 80% more contact hours in the program than Learning Laboratory students not using CAI (Control Group). Lab Exp. / Lab Cont. 167.76 hrs. / 92.18 hrs.
All students using CAI (Experimental Groups) will show more positive attitudes towards learning and the use of computer technology in an educational setting.	All students using CAI expressed increasingly favorable attitudes towards all aspects of learning. In addition, their desire and ability to utilize computer technology in their education increased.

Significant Findings of This Project (continued)

For More Details See Page

Conclusions and Recommendations

32-34

The results of both the current study and the long term three year study confirm that the use of Computer Assisted Instruction leads to significant cognitive and affective growth. In both structure and design, Computer Assisted Instruction appears to be an ideal supplementary learning medium for Adult Basic Education students. However, some changes are needed in both the scope of the curriculum and system capability so that a wider range and greater number of Adult Basic Education students can make use of the system.

PART II

GENERAL REPORT

OVERVIEW OF ADULT LEARNING CENTERS

The Adult Learning Centers of the Great Neck Public Schools provide adults who return to school to complete their education with a variety of courses and services. Courses are offered in Basic Education (ABE) including reading, mathematics, language arts and communication skills, English as a Second Language (ESL), High School Equivalency (HSE) preparation and Citizenship. Trained counselors provide both educational and vocational counseling. Included as a central component of the counseling program is the highly specialized Life Skills Employability Series which assists adults in meeting their present and future educational and vocational goals.

Instruction is offered both day and evening at various sites throughout the district. The instructional program takes place in classroom settings and individualized learning laboratories. The learning environment that students study within varies according to their instructional program. ABE students have the option of attending either a classroom (group instruction) or Learning Laboratory environment. ESL students study principally within classroom settings. HSE students study principally within individualized Learning Laboratory environments.

ABE classroom students study reading, language arts, mathematics and communication skills. After their individual educational needs are identified, they are provided with instruction that utilizes various educational formats, e.g., large groups, small groups, individualization, etc. Work conducted in the classroom is characterized by a high level of verbalization and emphasizes oral communication skills.

ABE Learning Laboratory students study reading, language arts and mathematics wihin a highly individualized learning environment. The Learning Laboratories utilize a diagnostic/prescriptive model in which individual student needs are diagnosed and study programs designed to promote meaningful interaction between the learner and his/her materials and thus facilitate learner growth and autonomy.

In an attempt to expand and improve the instructional programs of the classroom and learning laboratory environments, a proposal was submitted to the Unit of Basic Continuing Education, Division of Continuing Education, New York State Education Department for a special project utilizing CAI in reading, arithmetic and language arts for the adult learner. This project was awarded to the Adult Learning Centers of the Great Neck Public Schools. Accordingly, a computer, six video display terminals and a printer were installed in the central Learning Laboratory of the Adult Learning Centers.

HISTORY OF THE PROJECT

Background

1977

In February 1977, a Computer Assisted Instruction system consisting of a computer and six video display terminals was installed in the main Learning Laboratory of the Great Neck Adult Learning Centers. Computer Assisted Instruction was introduced initially to improve the quality of the educational programs offered to Adult Basic Education students studying primarily in the Learning Laboratory, an individualized learning environment. From mid-February to mid-June 1977, 60 Adult Basic Education students with reading levels in the third to seventh grade range utilized CAI as a core part of their study of reading, language and arithmetic. They were expected to spend a minimum of twenty minutes per week in each subject area as a complement to their studies in each area. This four month period represented the first experience of Adult Basic Education students in New York State with CAI.

In order to evaluate the effectiveness of CAI, these students' academic gains and attendance over the four month period were compared to the gains of forty-two ABE students, also from the Great Neck Adult Learning Centers, who did not use CAI. In addition, these student who utilized CAI were interviewed to determine if there were changes in their perceptions of their ability to learn and in their attitudes towards learning. The results of this study suggested that, even in a relatively short period, CAI has a very positive effect on cognitive growth, attendance and affective growth.

1977-78

In September 1977, the program was expanded to include Adult Basic Education Classroom students as well as Learning Laboratory students. This decision was based on two considerations. 1) the desire to expose as many students as possible to CAI, and 2) the desire to more fully utilize CAI. In the 1977-78 school year, CAI was utilized on a regular basis by 51 Learning Laboratory and 48 Classroom Adult Basic Education students. All of these students entered the program reading between the third and seventh grade level. The Learning Laboratory students once again were expected to spend a minimum of twenty minutes per week in reading, language and arithmetic. Classroom students were expected to study reading and language, each for a period of twenty minutes per week. This was a result of having a limited number of terminals, limited amounts of time and large numbers of students.

Again, the reading and mathematics progress and the attendance of Learning Laboratory students using CAI was compared with the cognitive growth and attendance of a Control Group of Learning Laboratory students not using CAI. The reading progress of Classroom students using CAI was compared to the reading progress of a Control Group of Classroom students who did not utilize CAI. The reading and mathematics progress

of Learning Laboratory students using CAI and the reading gains of Classroom students using CAI were compared with the cognitive gains of ABE students statewide. Once again, all students who utilized CAI were interviewed to identify affective changes associated with CAI use.

Once again the results suggested that CAI has a very positive effect or cognitive growth, affective growth and attendance.

Current Project 1978-79

During the 1978-79 year, 100 Adult Basic Education students, 50 from Learning Laboratory environments and 50 from Classroom environments, utilized CAI on a regular basis as a core part of their ABE program. These students ranged in age from 17 to 79. 67 were women and 33 were men. Once again, all of these students entered the program with reading levels ranging from the third to the seventh grade. Learning Laboratory students were once again expected to spend a minimum of twenty minutes per week in reading, language and arithmetic. Classroom students were again expected to study only reading and language for a minimum of twenty minutes per week.

Again, the reading and mathematics progress and the attendance of Learning Laboratory students using CAI was compared with the cognitive growth and attendance of a Control Group of Learning Laboratory students who did not utilize CAI. Reading progress made by Class students using CAI was again compared to reading progress of Class students not using CAI. Cognitive gains of those students using CAI were again compared to Adult Basic Education statewide norms. Again, individual and group interviews were conducted with all students using CAI to identify affective changes.

As in the first two years, results were extremely positive. Adult Basic Education students in the Great Neck Adult Learning Centers who utilized Computer Assisted Instruction exhibited much better cognitive growth and much better attendance than Adult Basic Education students from the same program who did not utilize CAI. Their cognitive growth rates doubled statewide averages. In addition, those students who utilized Computer Assisted Instruction exhibited important affective changes. Most important, those students who utilized CAI appear to become increasingly self-directed in their learning style.

COMPUTER ASSISTED INSTRUCTION (CAI):

WHAT IS IT?

Computer Assisted Instruction is a supplementary learning tool that is designed to help teachers teach more effectively and to engage the learner more fully in the educational experience. It is a system of instruction that makes use of the powers of the computer to perform the following tasks:

1. Diagnose student learning problems.
2. Present individually appropriate drill and practice learning material to student.
3. Keep detailed records of student progress throughout the curriculum.

More specifically, CAI integrates three basic components: a programmed curriculum, an instructional strategy and a computer which is comprised of a meticulously selected and carefully validated body of information specifically designed for use with a CAI system. The instructional strategy directs student progress through the curriculum by individually evaluating the student's work and by matching the level of the material received to actual achievement level. The system itself computes the student's progress and keeps records and diagnostic information for teacher use. It is these three combined system capabilities that, in part, comprise the rationale for the CAI system's utilization in the Great Neck Adult Learning Centers.

THE CURRICULUM: ITS NATURE AND FORMS

The Computer Curriculum Corporation's Adult Basic Education Program consists of four Adult Skills Courses entitled:

Adult Reading Skills
Adult Arithmetic Skills
Adult Language Skills I
Adult Language Skills II

Each course consists of "strands" or skill areas. In each course, the student begins with relatively easy items. As the student shows mastery at a given level, the computer presents progressively more difficult material. A typical lesson consists of items chosen randomly from the various strands. Progress through any particular strand or course is independent of progress in any of the others. The student works at his own pace and can move quickly through skills he has mastered but remains at areas where extra work is needed. Neither the student's performance in any "other" course, nor the performance of other students taking the "same" course affect the student's progress in any way.

The reading curriculum is divided into five strands. It begins with single sentence items and builds to paragraphs. Substantial portions of the curriculum introduce vocabulary related to consumer education. Adult Reading Skills consist of the following skills: (see Appendix#1).

a) Word Attack
Suffixes, prefixes, root words, compounds, contractions.

b) Vocabulary Study
Homonyms, synonyms, antonyms.

c) Literal Comprehension
Categories, transformations, questions and answers.

d) Interpretive Comprehension
Fact and opinion, preliminary inference, character study, analogies, slanted writing, metaphors, similes.

e) Work Study Skills
Alphabetizing, finding information.

The arithmetic curriculum is divided into eight strands. At a given session, a student will encounter problems at different levels of complexity from each strand, the level being determined by the student's achievement in each strand. Arithmetic is the only one of the Adult Skills courses in which a teacher or student may choose the appropriate starting level. Furthermore, a student may choose to drill on one particular skill for the entire ten minute lesson. Adult Arithmetic Skills consists of the following skills: (see Appendix #2).

a) Addition.

b) Subtraction.

c) Multiplication.

d) Division.

e) Equations.

f) Fractions.

g) Measurements.

h) Decimals.

The language arts curriculum is divided into two courses, Adult Language Skills I and Adult Language Skills II, each of which is divided into eight strands plus a review strand.

The two language arts courses are similar in design and structure. However, Adult Language Skills II utilizes more advanced vocabulary and allows for somewhat faster progression through the course. Adult Language Skills I and II consist of the following skills: (see Appendix #3)

a) Principal Parts of Verbs.

b) Verb Usage.

c) Subject-Verb Agreement.

d) Pronoun Usage.

e) Contractions, Possessives and Negatives.

f) Modifiers.

g) Sentence Structure.

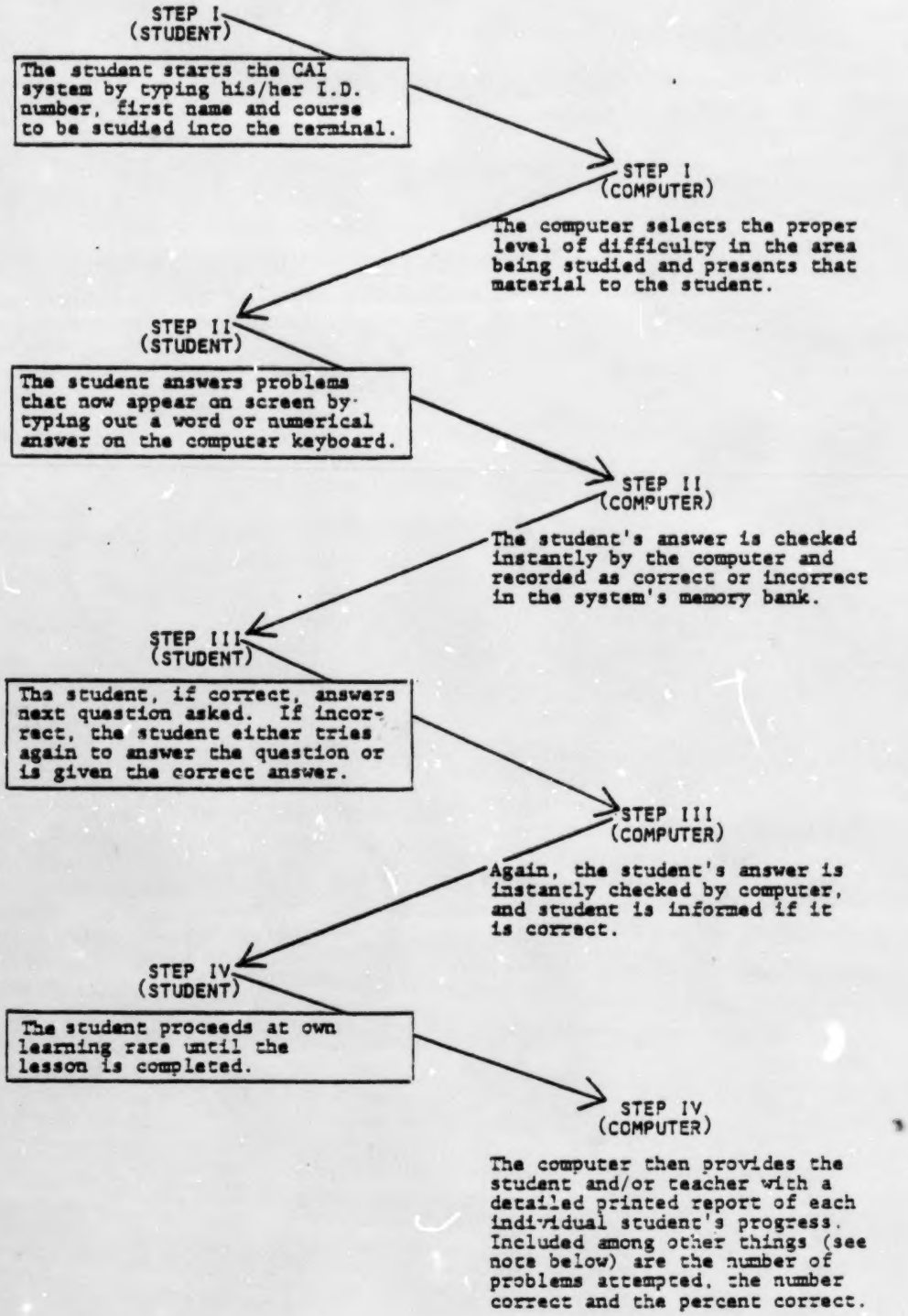
h) Mechanics (capitalization, punctuation).

i) Topics (a special review strand).

These courses were developed to meet the educational needs of adults who lack basic reading, arithmetic and language competencies. All are designed for adults functioning between the third to seventh grade level and each develop a drill and practice rather than an instructional mode. Each course is self-contained and can be used without supplementary tests or workbooks. Furthermore, each course has a built-in diagnostic procedure which allows the student to progress rapidly through concepts which have already been mastered.

COMPUTER ASSISTED INSTRUCTION STUDENT/SYSTEM OPERATING PROCEDURES

All students receive CAI lessons by means of one of six video display terminals located in the central Learning Laboratory of the Adult Learning Centers. The general procedure adhered to by students as they engage with the CAI system is as follows:


STEP I (STUDENT)
The student starts the CAI system by typing his/her I.D. number, first name and course to be studied into the terminal.
STEP I (COMPUTER)
The computer selects the proper level of difficulty in the area being studied and presents that material to the student.
STEP II (STUDENT)
The student answers problems that now appear on screen by typing out a word or numerical answer on the computer keyboard.
STEP II (COMPUTER)
The student's answer is checked instantly by the computer and recorded as correct or incorrect in the system's memory bank.
STEP III (STUDENT)
The student, if correct, answers next question asked. If incorrect, the student either tries again to answer the question or is given the correct answer.
STEP III (COMPUTER)
Again, the student's answer is instantly checked by computer, and student is informed if it is correct.
STEP IV (STUDENT)
The student proceeds at own learning rate until the lesson is completed.
STEP IV (COMPUTER)
The computer then provides the student and/or teacher with a detailed printed report of each individual student's progress. Included among other things (see note below) are the number of problems attempted, the number correct and the percent correct.

NOTE: Additionally, the report provides information on progress in specific skill areas and the percentage of the course completed in each skill area.

STAFFING

There are two full time staff members for the Computer Assisted Instruction project, the Project Coordinator and the Project Aide. In choosing these staff members, experience in Adult Basic Education and a proven ability to work with Adult Basic Education students were considered more important than previous experience working with computers. In fact, neither of the project staff had any prior experience with the use of computers in education. Both were trained in a brief intensive workshop and provided with ongoing support by the system's vendor.

Among the experiences and abilities considered appropriate for the Project Coordinator were the following:

a) Experience in Adult Basic Education. Knowledge of theory, methods and materials utilized in a diagnostic-prescriptive format.

b) Experience and proven ability to work successfully with Adult Basic Education students.

c) Experience in administration and logistical detail.

d) Ability to be trained in the mechanics of CAI.

e) Experience in staff supervision.

f) Experience in record keeping and evaluation.

Among the experiences and abilities considered appropriate for the Project Aide were the following:

a) Experience in Adult Basic Education.

b) Experience and proven ability to work successfully with Adult Basic Education students.

c) Ability to be trained in the mechanics of CAI.

d) Experience in record keeping and statistical work.

It was the responsibility of the Project Coordinator to perform the following functions:

a) Make educational decisions about the appropriateness of various courses for particular students.

b) Assign appropriate non-CAI materials to the student based on diagnostic information from the system.

c) Communicate student needs, as diagnosed by the system, to Learning Laboratory and classroom teachers.

d) Conduct individual and group interviews with students to gain feedback and answer questions related to the use of CAI.

e) Schedule Learning Laboratory and Classroom students' use of CAI to make maximum use of the system and coordinate schedules with Learning Laboratory and classroom teachers.

f) Monitor CAI use, including both attendance and progress.

g) Supervise enrollment procedures and collection of data from the system.

h) Instruct students and other staff in the use of CAI.

i) Enroll students and perform routine maintenance

j) Report all major problems.

k) Supervise Project Aide.

l) Oversee collection of all data related to CAI evaluation, especially test scores and attendance.

m) Write evaluation designs and project evaluations along with the Program Director and the Media Specialist.

It was the responsibility of the Project Aide to perform the following functions:

a) Enroll new students on CAI.

b) Instruct students in the use of CAI, orient them to the system and answer all questions related to CAI.

c) Observe and talk with students using CAI to gain feedback.

d) Perform routine maintenance including weekly back-up procedures.

e) Perform all steps necessary to receive weekly printed reports of student progress on the system.

f) Perform all record keeping regarding CAI students.

g) Keep all statistics regarding CAI attendance

h) Collect data needed for CAI evaluation.

In addition to the project staff, the Adult Learning Center's Media Specialist has become increasingly involved in certain aspects of CAI. Along with the Project Coordinator, the Media Specialist conducts and records group interviews to gain feedback on CAI. The Media Specialist is also very much involved in the writing of evaluation designs and project evaluations.

All Learning Laboratory staff have received ongoing orientation regarding the use of the system and are able to instruct students on the use of the system and answer their questions regarding CAI.

OBJECTIVES OF STUDY

CURRENT STUDY (1978-79)

COGNITIVE

To determine if Lab Experimental students exhibit greater cognitive growth on standardized reading and mathematics tests than Lab Control students.

To determine if Lab Experimental students exhibit greater cognitive growth on standardized reading and mathematics tests than Adult Basic Education students statewide.

To determine if Class Experimental students exhibit greater cognitive growth on standardized reading tests than Class Control students.

To determine if Class Experimental students exhibit greater cognitive growth on standardized reading tests than Adult Basic Education students statewide.

AFFECTIVE

To determine if Lab Experimental students establish more sustained contact with the Adult Learning Centers than Lab Control students.

To determine if students using Computer Assisted Instruction express more positive attitudes towards learning in general and Computer Assisted Instruction in particular.

PREVIOUS STUDIES (1977-78)

Objectives have remained consistent throughout the three years of this study.

COGNITIVE

Lab Experimental students will exhibit greater cognitive growth on standardized reading and math tests than Lab Control students and Adult Basic Education students statewide.

Class Experimental students will exhibit greater cognitive growth on standardized reading tests than Class Control students and Adult Basic Education students statewide.

Note: Computer Assisted Instruction was not made available to Class students during the initial 1977 evaluation period.

AFFECTIVE

Lab Experimental students will establish more sustained contact with the Adult Learning Centers than Lab Control students.

Students using Computer Assisted Instruction will express more positive attitudes towards learning in general and Computer Assisted Instruction in particular.

Note: Different instruments were utilized during each year of the study to determine if this objective had been met.

1977 -	Individual and Group Interviews, Attitudinal Questionnaires administered as Pre and Post Tests.
1977-78	Individual and Group Interviews.
1978-79	Individual and Group Interviews, Semantic Differential administered as Pre and Post Tests.

EVALUATION DESIGN

I GROUP DESIGN

Students in the Great Neck Adult Learning Centers will be divided into Experimental and Control Groups as described below.

A) Experimental Group

This umbrella group will consist of two separate sub-groups as described below.

> All those students who study reading and arithmetic using a Computer Assisted Instruction System and primarily attend and study in a Learning Laboratory setting. (Lab Experimental Group).
>
> AND
>
> All those students who study reading from a Computer Assisted Instruction System and primarily attend and study in a group instruction Adult Basic Education classroom environment. (Class Experimental Group).

B) Control Group

This umbrella group will consist of two separate sub-groups as described below.

> All those students who primarily attend and study in Learning Laboratory settings who will not in any way be engaged in learning reading and arithmetic from a Computer Assisted Instruction system. (Lab Control Group).
>
> AND
>
> All those students who primarily attend and study in group instruction Adult Basic Education classroom settings who will not in any way be engaged in learning reading from a Computer Assisted Instruction System. (Class Control Group).

II COGNITIVE STUDY

A) Standardized Test Results

A nationally recognized standard achievement test (CAT) will be administered at the beginning and end of the evaluation period as pre and post tests. Grade level equivalents on pre and post tests will be established and growth will be computed by the difference between the pre and post test scores.

Comparisons will be made between the following groups:

1) Lab Experimental vs Lab Control (Reading and Mathematics).
2) Lab Experimental vs State Norms (Reading and Mathematics).
3) Class Experimental vs Class Control (Reading).
4) Class Experimental vs State Norms (Reading).
5) 1978-79 Experimental students vs 1977-78 Experimental students. Only students who were in both 1977-78 and 1978-79 Experimental Groups will be included (Reading and Mathematics).
6) Lab Experimental vs Class Experimental (Reading).

B) PROGRESS ON COMPUTER ASSISTED INSTRUCTION.

Progress through the CAI system will be defined by the percentage of the course completed. This information is recorded within the CAI system. The following data on progress will be analyzed.

1) The percentage of each course - Adult Reading Skills, Adult Arithmetic Skills, Adult Language Skills I and Adult Language Skills II - completed by members of this year's Experimental Group.

Note: The number of students completing Computer Assisted Instruction courses for the entire three years will also be recorded and analyzed.

III AFFECTIVE STUDY

A) Attendance

Records will be kept of the total number of hours of attendance of Adult Basic Education students in the Learning Laboratories. Comparisons will be made between the following groups:

1. Lab Experimental vs Lab Control.
2. 1978-79 Lab Experimental vs 1977-78 Lab Experimental.

Note: Only students who were in both the 1977-78 and 1978-79 Lab Experimental Groups will be included.

B) Student Interviews

Individual and group discussions with Lab and Class Experimental Group students will be conducted by both a Learning Laboratory Specialist and Communication Specialist in an attempt to elicit affective information relating to their use of CAI. These open, but focused discussions, will be audio taped and then transcribed. The purpose of these interviews will be to determine if CAI helps students to:

1. learn more effectively.
2. observe their progress in the program more clearly.
3. identify skill areas in need of improvement.
4. become aware of specific skill areas in which they have improved.
5. work more independently.

(See Appendix #4 for an outline of discussion questions used).

C) Semantic Differential

A semantic differential designed to measure the evaluative meaning students have towards their education, CAI and other related school topics will be administered to both Experimental and Control Groups in the form of a pre and post test.

1. The difference between the pre and post test score will be computed for each group.
2. A comparison of difference scores will be made between the Experimental and Control Groups.

(See Appendix #5 for copy of Semantic Differential used).

MATCHED OBJECTIVES AND OUTCOMES
CURRENT STUDY
78/79

Below are the objectives of the 1978-79 study matched with the actual outcomes. The figures on the right indicate years of growth as measured by performance on standardized tests.

OBJECTIVES	OUTCOMES		
		Exp.	Cont.	Statewide
COGNITIVE				
Lab Experimental students will exhibit greater cognitive growth on standardized reading and mathematics tests than Lab Control students.	Reading	2.81	vs 2.11	-
	Math	2.80	vs 2.9	-
Lab Experimental students will exhibit greater cognitive growth on standardized reading and mathematics tests than Adult Basic Education students statewide.	Reading	2.81	vs -	1.40
	Math	2.80	vs -	1.40
Class Experimental students will exhibit greater cognitive growth on standardized reading tests than Class Control students.	Reading	2.63	vs 1.79	-
Class Experimental students will exhibit greater cognitive growth on standardized reading tests than Adult Basic Education students statewide.	Reading	2.63	vs -	1.40
AFFECTIVE				
Lab Experimental students will establish more sustained contact with the Adult Learning Centers than Lab Control students.		Lab.Exp.		Lab Cont.
	Attendance	167.76 hrs.	vs	92.18 hrs.
Students using Computer Assisted Instruction will express more positive attitudes towards learning in general and Computer Assisted Instruction in particular.	Students expressed increasingly positive attitudes towards all aspects of learning. In addition, their desire and ability to utilize computer technology in their education increased.			

MATCHED OBJECTIVES AND OUTCOMES
THREE YEAR STUDY
77-77/78

Below are the objectives of the first three years of CAI use matched with the actual outcomes. Attendance figures for 1977 are based on the four months during which CAI was in use. CAI was not available to class students during the initial evaluation period.

OBJECTIVES

COGNITIVE

Lab Experimental students will exhibit greater cognitive growth than Lab Control students and Adult Basic Education students statewide in reading and mathematics.

OUTCOMES

	Lab Exp.	Lab Cont.	Statewide
	READING		
77	2.30	1.58	1.2
77/78	2.60	1.73	1.2
78/79	2.81	2.11	1.4
	MATHEMATICS		
77	2.20	1.72	1.2
77/78	1.91	1.27	1.2
78/79	2.80	2.19	1.4

Class Experimental students will exhibit greater cognitive growth than Class Control students and Adult Basic Education students statewide in reading.

	Class Exp.	Class Cont.	Statewide
	READING		
77/78	1.92	1.51	1.2
78/79	2.63	1.79	1.4

AFFECTIVE

Lab Experimental students will establish more sustained contact than Lab Control students.

ATTENDANCE IN HOURS

	Lab Exp.	Lab Cont.
77	62	42
77/78	125.51	73.80
78/79	167.76	92.18

Experimental Group students will show more positive attitudes towards learning and the use of computer technology in an educational setting.

Students throughout the three year study consistently express favorable attitudes towards all aspects of learning. In addition, their desire and ability to utilize computer technology in their education increased.

FINDINGS

I. COGNITIVE 1978-79

A) STANDARDIZED TEST RESULTS - The following comparisons are based on progress as measured by nationally standardized reading and mathematics tests (CAT).

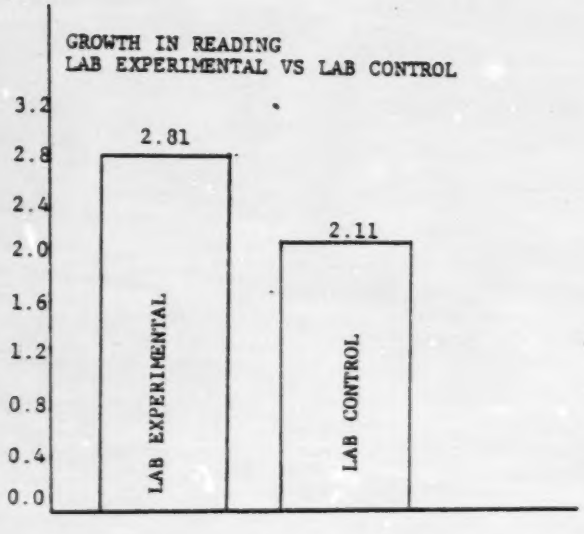
1. LAB EXPERIMENTAL VS LAB CONTROL (Reading and Mathematics)

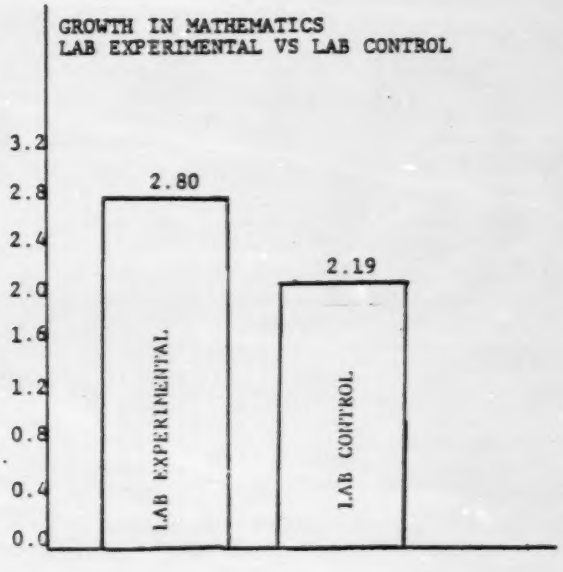
	Lab Exp.	Lab Control	Difference
Reading	2.81	2.11	.70
Mathematics	2.80	2.19	.61

INTERPRETATIONS/CONCLUSIONS

Lab students utilizing CAI showed far greater cognitive growth in both reading and mathematics than Lab students not utilizing CAI. This indicates that the use of Computer Assisted Instruction has a very positive impact on cognitive growth.

DOCUMENTATION





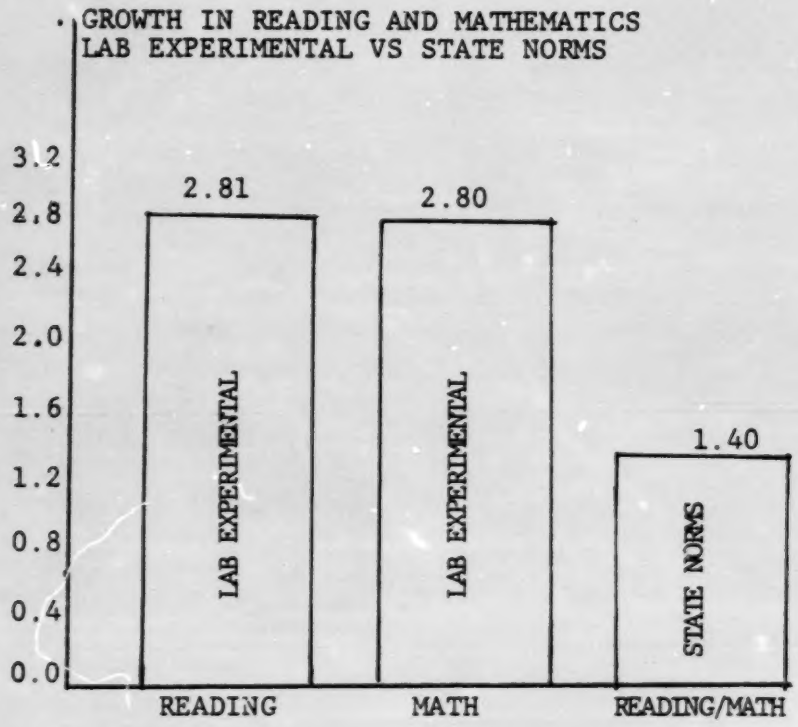
2. LAB EXPERIMENTAL VS STATE NORMS (Reading and Mathematics)

	Lab Exp.	State Norms	Difference
Reading	2.81	1.40	1.41
Mathematics	2.80	1.40	1.40

INTERPRETATIONS/CONCLUSIONS

Students utilizing CAI doubled state norms in both reading and mathematics.

DOCUMENTATION



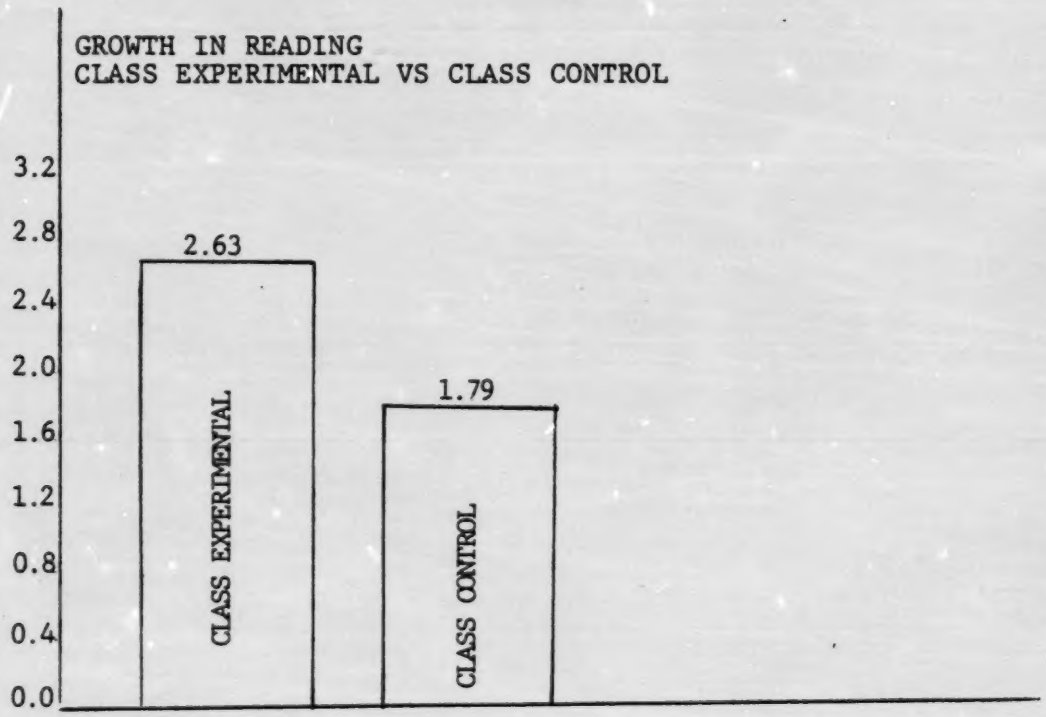
3. CLASS EXPERIMENTAL VS CLASS CONTROL (Reading)

	Class Exp.	Class Control	Difference
Reading	2.63	1.79	.84

INTERPRETATIONS/CONCLUSIONS

Those class students with access to CAI showed far greater improvement than those without access to CAI.

DOCUMENTATION



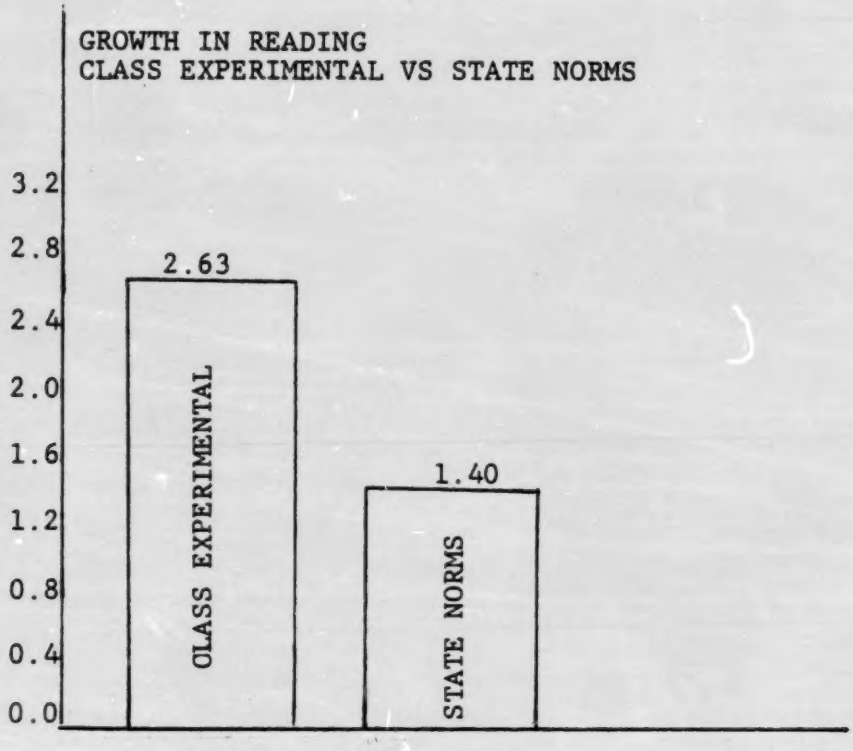
4. CLASS EXPERIMENTAL VS STATE NORMS (Reading)

	Class Exp.	State Norms	Difference
Reading	2.63	1.40	1.23

INTERPRETATIONS/CONCLUSIONS

Class students utilizing CAI showed far greater growth in reading than ABE students statewide, almost doubling their progress.

DOCUMENTATION



5. 1977/78 EXPERIMENTAL STUDENTS VS 1978/79 EXPERIMENTAL STUDENTS (Reading and Mathematics)

	1977/78	1978/79	Difference
Reading	2.17	2.31	.14
Mathematics	2.29	2.23	(-).06

INTERPRETATIONS/CONCLUSIONS

Students utilizing CAI for more than one year continue to improve. Of the one hundred Lab and Class Experimental students utilizing the reading and language programs during 1978/79, thirty-one had been in the Experimental Groups the previous year. Of these, seventeen showed more growth during the 1978/79 year and fourteen showed more growth in 1977/78. The entire group showed a slightly higher gain in 1978/79.

Of the forty-eight students in the Lab Experimental group in mathematics, fifteen had been in this group the previous year. Of these, ten students showed more growth during the 1978/79 year and five showed more growth in 1977/78. The entire group showed a slightly lower gain in 1978/79.

These results, although not conclusive, suggest that students continuing CAI use over a period of more than a year are likely to show increasing, rather than decreasing rates of growth.

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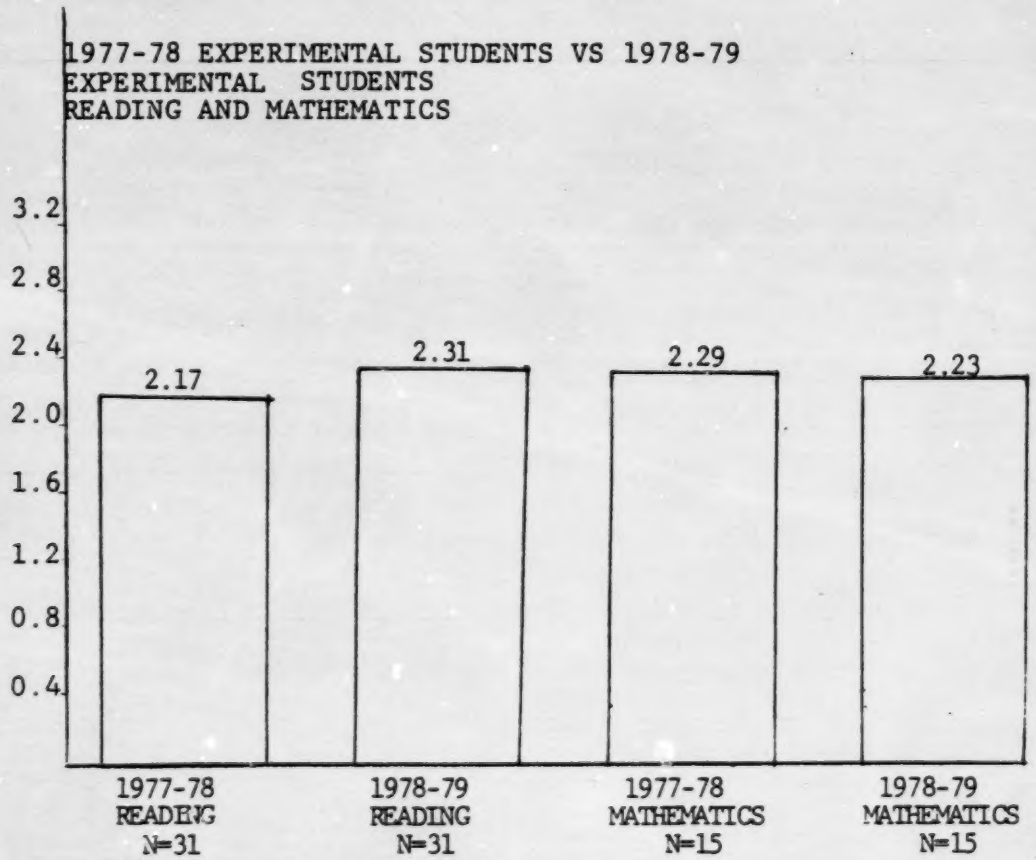


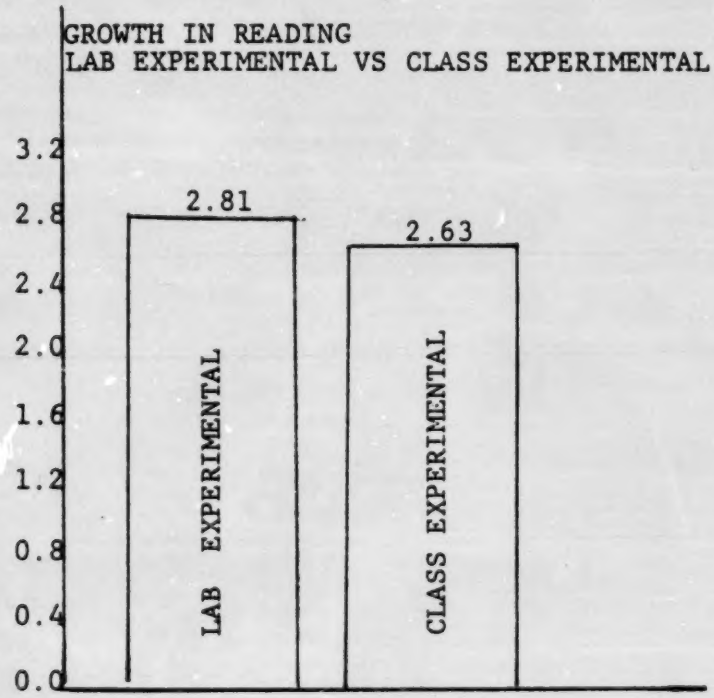
6. LAB EXPERIMENTAL VS CLASS EXPERIMENTAL (Reading)

	Lab Exp.	Class Exp.	Difference
Reading	2.81	2.63	.18

INTERPRETATIONS/CONCLUSIONS

Both Lab and Class Experimental groups showed dramatic progress in reading. The differences in growth rates between the two groups are too slight to allow conclusions concerning which is the more effective environment for CAI use to be drawn. Reading progress among class students was far greater than in the previous year, which reflects the greater ability of class teachers to use diagnostic information from CAI to meet individual students' needs.

DOCUMENTATION



E) PROGRESS ON CAI - The following data is based on progress through the CAI system. A student can only progress by demonstrating mastery at a particular level. Therefore, the percentage of the course completed indicates the degree to which the student has mastered the entire curriculum.

The chart below indicates the number of students completing the following percentages of the reading and language courses.

% OF COURSE COMPLETED	READING	LANGUAGE	LANGUAGE 2
100%	21	26	13
75-100%	8	17	9
50-75%	15	9	5
25-50%	17	22	14
LESS THAN 25%	39	26	32
NO WORK	0	0	27

The chart below indicates the number of students completing the following levels of difficulty in Adult Arithmetic Skills. Highest levels of difficulty in the particular skills range from 25 (addition) to 36 (equations, fractions, decimals). (See curriculum for more details).

The numbers indicate progress through the two modes of studying arithmetic: the Normal Strand, in which the student answers questions from a variety of skill areas, and the Fixed Strand in which the student answers questions from only one skill area at a time. The completion level of the Normal Strand represents the average completion of all skill areas. The completion level of the Fixed Strand indicates the level of the last Fixed Strand the student completed.

LEVEL OF COURSE COMPLETED	NORMAL STRAND	FIXED STRAND
Higher than 25	0	2
20-25	5	8
15-20	15	8
10-15	8	3
5-10	5	4
Less than 5	15	0

INTERPRETATIONS/CONCLUSIONS

The above data indicates that ABE students are able to progress through the material presented in the CAI curriculum. Beyond that, it is difficult to draw conclusions. Students with different levels of skill starting at the same point in the curriculum can be expected to show different rates of progress. The data reflects this. However, it is difficult to compare progress on the system because for one student to complete 5% of the course may represent greater growth than for another student to complete 50% of the course.

In the first two and one half years of CAI, use the following number of students have completed Adult Skills Courses:

Adult Reading Skills -51
Adult Language Skills I -68
Adult Language Skills II -34

INTERPRETATIONS/CONCLUSIONS

The above data indicates that ABE students are able to complete the Adult Skills Courses. The data demonstrates the need for courses at a higher level of difficulty.

II AFFECTIVE-1978-79

A) ATTENDANCE 1978-79 - The following comparisons are based on total hours of attendance.

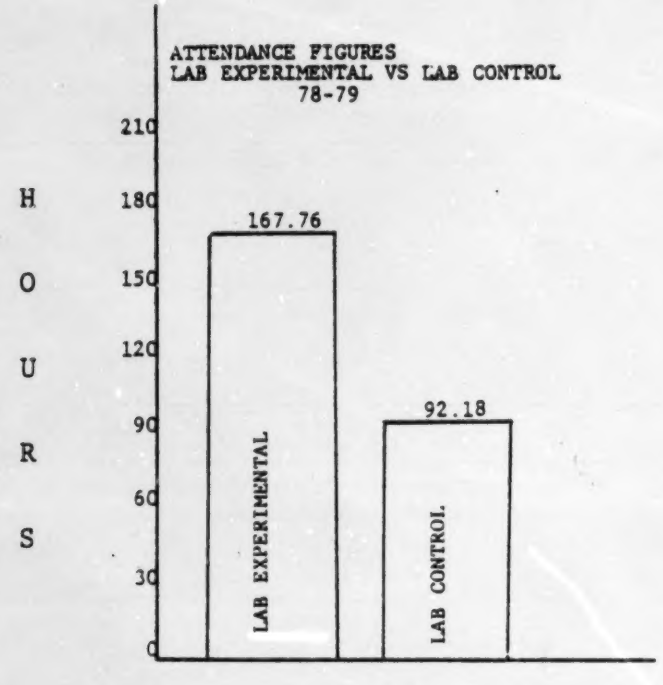
1. LAB EXPERIMENTAL VS LAB CONTROL (ATTENDANCE IN HOURS)

Lab. Exp.	Lab Control	Difference
167.76 hrs.	92.18 hrs.	75.58 hrs.

INTERPRETATIONS/CONCLUSIONS

Members of the Lab Experimental Group averaged approximately 80% more contact hours with the Great Neck Adult Learning Centers than students in the Lab Control Group. This difference indicates that access to Computer Assisted Instruction has a very positive impact on the pattern of student attendance.

DOCUMENTATION



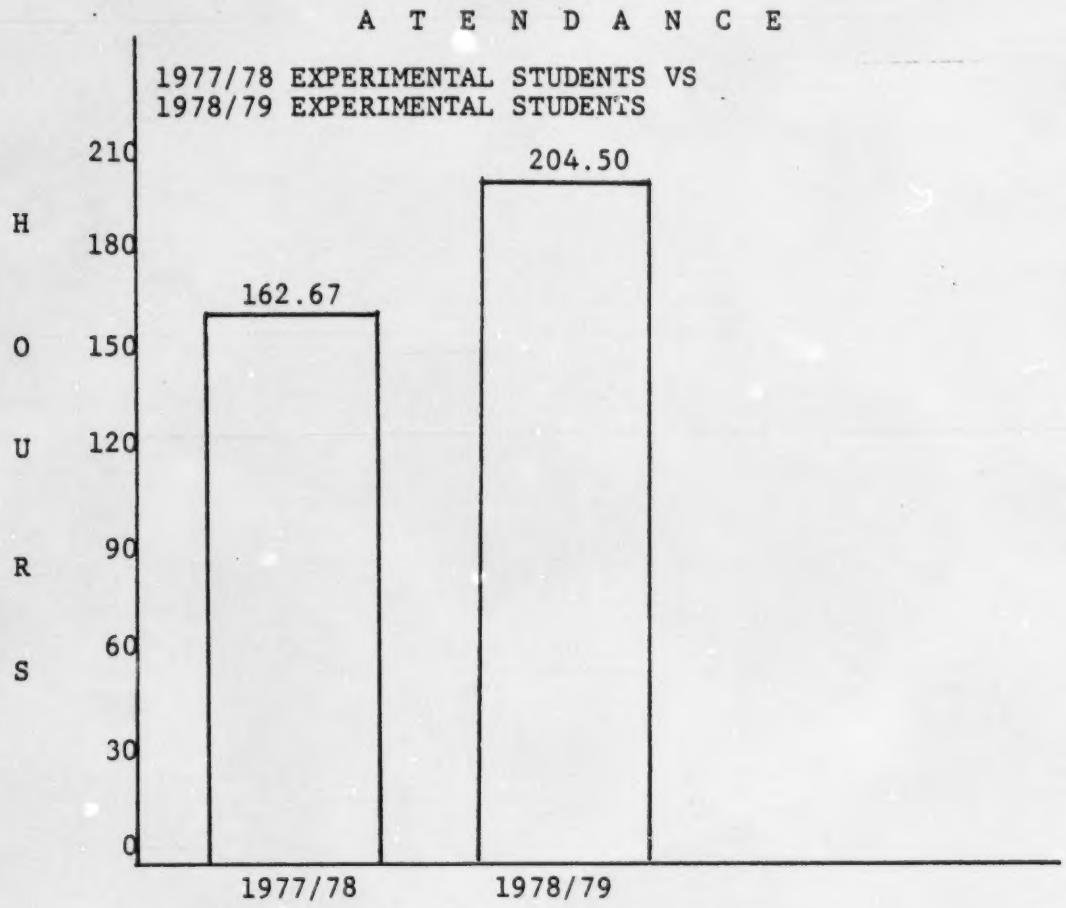
2. 1977/78 LAB EXPERIMENTAL STUDENTS VS
1978/79 LAB EXPERIMENTAL STUDENTS (ATTENDANCE IN HOURS)

1977/78	1978/79	Difference
162.67 hrs.	204.50 hrs.	41.83 hrs.

INTERPRETATIONS/CONCLUSIONS

Students utilizing CAI for more than one year showed improved rates of attendance. This indicates that students maintain interest in their education and CAI use over time.

DOCUMENTATION



B) SEMANTIC DIFFERENTIAL - The following data is based on the responses to the semantic differential of 100 experimental and 100 control group students. A mean of 5.00 constitutes the most favorable score possible for any student and/or group.

1. COMBINED EXPERIMENTAL VS COMBINED CONTROL
(Lab & Classroom) (Lab & Classroom)

	Pre-Test	Post-Test	Difference
Experimental	4.25	4.42	.15
Control	4.14	4.30	.16

INTERPRETATIONS/CONCLUSIONS

The data above indicates that Great Neck Adult Learning Centers' students tend to enter the program with attitudes that are highly favorable to the educational process in which they are about to participate.

The highly favorable pre-test scores for both groups created a situation that allowed for very little measurable growth. The semantic differential instrument simply was not capable of measuring the considerable attitudinal growth that was manifested.

C) GROUP DISCUSSIONS/INTERVIEWS - Individual and group discussions were conducted throughout the 1978-79 school year with students utilizing Computer Assisted Instruction. These open ended discussions focused on issues related to self-directedness of learning style and progress in basic skills.

More specifically, these interviews were designed to elicit information concerning the following questions.

1. QUESTIONS

a. Do students enjoy using Computer Assisted Instruction? Do students find Computer Assisted Instruction helpful?
b. Are students able to see progress through the Computer Assisted Instruction Program?
c. Are students (through using Computer Assisted Instruction) able to identify areas of need they had not recognized previously? If so, do they get help in those areas?
d. Are students (through using Computer Asssited Instruction) aware of improvements in specific skill areas they originally found difficult?
e. Does Computer Assisted Instruction have any impact on students' desire or ability to work independently?
f. Do students have any suggestions as to how Computer Assisted Instruction could be improved?

2. SUMMARY OF RESPONSES

The following sentiments were repeteadly expressed by those students utilizing Computer Assisted Instruction.

a. Almost without exception, students enjoy using Computer Assisted Instruction and find it a useful part of their study program.

b. Students are very aware of the scores they achieve on each particular lesson and monitor their progress throughout the Computer Assisted Instruction Program.

c. Most students who use Computer Assisted Instruction are able to identify areas of need and to seek extra help in those areas. Other students expressed the need to have weak areas identified for them by teachers. Virtually all students have received extra work in those areas diagnosed by Computer Assisted Instruction as needing reinforcement.

d. All students who use Computer Assisted Instruction were able to recognize improvement in specific skill areas as a result of Computer Assisted Instruction.

e. Many students find that since beginning Computer Assisted Instruction, they are more willing to work independently both on Computer Assisted Instruction and on other materials.

f. Many students have positive suggestions as to how the Computer Assisted Instruction program can be improved. Suggestions include:

   1. a pause button to allow the student to take notes;

   2. a mechanism that would allow the teacher to overide the system and start students on appropriate skill levels;

   3. a diagnostic-prescriptive curriculum at higher skill levels;

   4. a program which would teach parts of speech.

THREE YEAR COGNITIVE FINDINGS

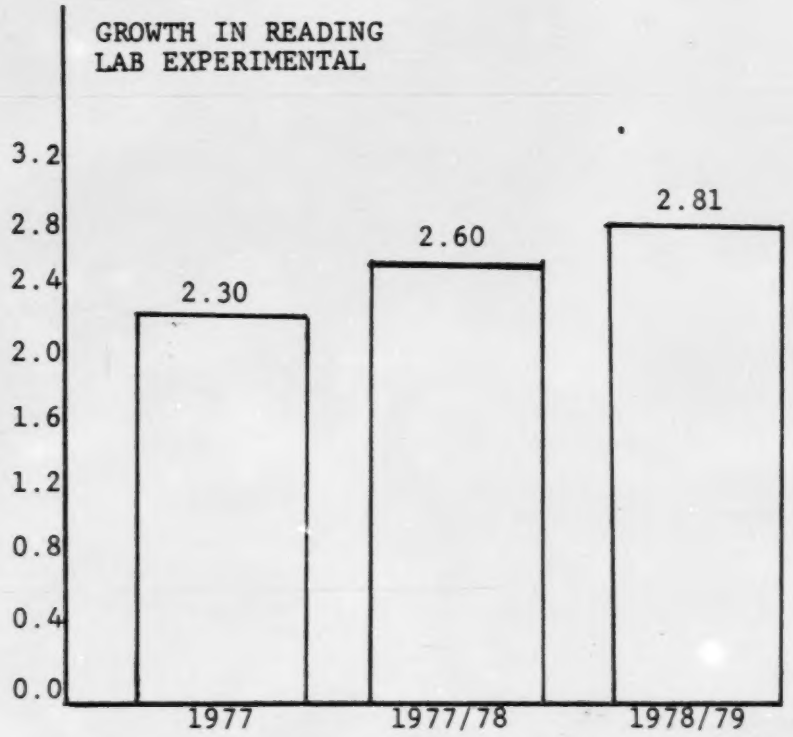
The Great Neck Adult Learning Centers has just completed its third year of CAI use. The figures below reflect years of growth and summarize the major cognitive and affective findings of the three year study.

COGNITIVE

LAB READING	EXPERIMENTAL	CONTROL	DIFFERENCE
1977	2.30	1.58	.72
1977-78	2.60	1.73	.87
1978-79	2.81	2.11	.70

INTERPRETATIONS/CONCLUSIONS

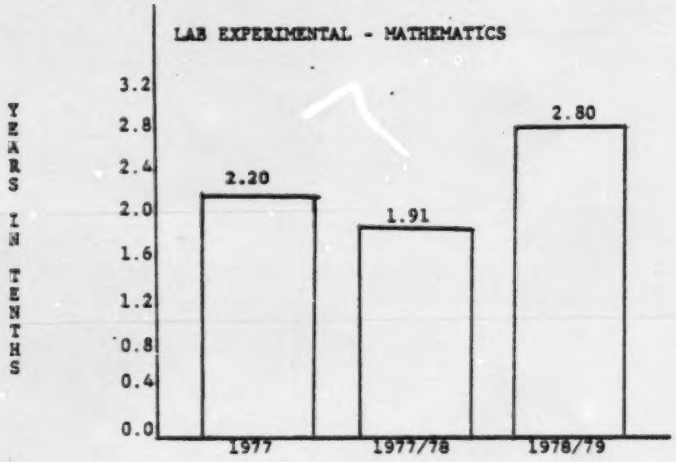
During each year of the study, those learning laboratory students utilizing CAI showed much greater progress in reading than those not utilizing CAI. This group has also shown steady improvement from year to year.



LAB MATHEMATICS	EXPERIMENTAL	CONTROL	DIFFERENCE
1977	2.20	1.72	.48
1977-78	1.91	1.27	.64
1978-79	2.80	2.19	.61

INTERPRETATIONS/CONCLUSIONS

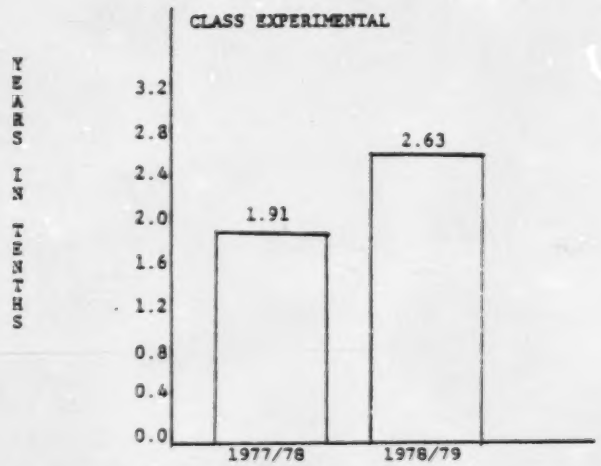
During each year of the study, those learning laboratory students utilizing CAI showed much greater progress in mathematics than those not utilizing CAI. The tremendous growth in the 1978-79 year over the previous year reflects more efficient use of the system and the establishment of mathematics as a greater priority.



CLASS READING	EXPERIMENTAL	CONTROL	DIFFERENCE
1977-78	1.92	1.51	.41
1978-79	2.63	1.79	.84

INTERPRETATIONS/CONCLUSIONS

Those class students utilizing CAI showed considerable improvement in reading over the previous year. This greater growth relative to the control group in the second year of class use reflects increased efficiency in CAI use and the greater ability of classroom teachers to utilize the diagnostic information provided by the system.



THREE YEAR AFFECTIVE FINDINGS

LAB ATTENDANCE	EXPERIMENTAL	CONTROL	DIFFERENCE
1977 (over 4 months)	67	42	25
1977-78	125.51	73.80	51.71
1978-79	167.76	92.18	75.58

INTERPRETATIONS/CONCLUSIONS

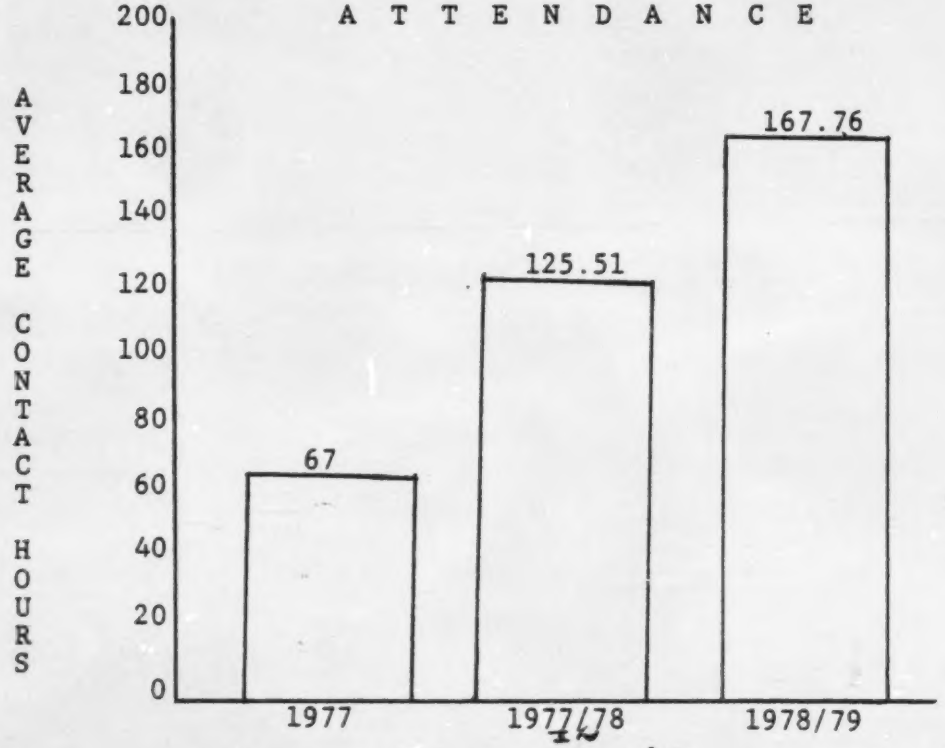
During each year of the study, those learning laboratory students utilizing CAI established much more consistent and sustained contact with the Adult Learning Centers than those not utilizing CAI. Attendance has improved during each year of the study.

ATTITUDINAL CHANGES

During each year of the study, extensive individual and group interviews revealed that students using CAI had very positive attitudes about its use. Use of CAI seems to have brought about changes in students' perceptions of themselves as learners. Students using CAI:

1) express more confidence in their ability to learn
2) show increased ability to work independently
3) concentrate more intensely and work more quickly
4) become increasingly aware of academic progress
5) diagnose their own skills and weakness
6) become more autonomous and self-directed in their learning style

DOCUMENTATION



STAFF/STUDENT REACTIONS

Students find it helpful to study reading, arithmetic and language arts on a Computer Assisted Instruction system because it:

1. provides immediate feedback to each student response.
2. allows them to work in privacy, in competition only with themselves.
3. helps them to do large amounts of work in relatively short time periods.
4. helps them become aware of progress in various skill areas.
5. provides detailed reports at the end of each lesson.

Students find that using CAI improves their ability to:

1. concentrate.
2. work quickly.
3. work independently.
4. diagnose their own skills and weakness.
5. see their progress.
6. perform the various skills covered in the CAI curriculum.

Adult Basic Education teachers also respond very favorably towards CAI. The most significant outcomes of CAI use according to the teachers are that it:

1. helps both teachers and students to diagnose student needs.
2. makes students more open to individualized instruction.
3. measures success quantitatively.
4. is interesting and is a good motivator.

CONCLUSIONS AND RECOMMENDATIONS

The Great Neck Adult Learning Centers has just completed a three year pilot study on the use of Computer Assisted Instruction. This represents the first use of Computer Assisted Instruction by Adult Basic Education students in New York State. At this point in time, it can be stated quite clearly: Computer Assisted Instruction is responsible for dramatic cognitive and affective growth among Adult Basic Education students.

Just as important is the finding that, as a program learns more about CAI and how to incorporate it into an instructional framework, CAI becomes a more effective tool over time. In the 1978/79 year, Learning Laboratory students utilizing CAI averaged 2.81 years of growth in reading, 2.80 years of growth in mathematics and 167.76 hours of attendance. Classroom students utilizing CAI averaged 2.63 years of growth in reading. These gains are considerably higher than gains by the respective control groups and Adult Basic Education students statewide. Perhaps, even more importantly, they represent considerable gains over the performance of the same group during the previous years of study. As Computer Assisted Instruction has become an increasingly integral part of the Adult Basic Education program in Great Neck,it has led to steadily increasing cognitive and affective growth.

There are a number of elements of Computer Assisted Instruction which help to explain the dramatic cognitive growth associated with CAI use.

....CAI is individualized; that is, each student moves entirely at his/her own pace, totally unaffected by the performance of any other student.

....CAI provides up-to-the-minute diagnosis of students' areas of strength and weakness, thus helping Learning Laboratory instructors and classroom teachers perform their tasks more thoroughly and efficiently.

....CAI allows the student only a limited amount of time in which to respond to the questions presented. Most students find that this helps them to improve both their rate of comprehension and their ability to concentrate.

....CAI, unlike most available print/audio media, provides the student with immediate feedback on his/her progress.

....CAI utilizes a reporting system which provides the student with a clear picture of his/her progress.

When one understands all the capabilities of the system, the cognitive growth evidenced by those students utilizing CAI is not at all surprising.

Probably even more dramatic than the cognitive gains associated with the use of CAI are the affective gains.

....Students who use CAI are more likely to perceive themselves as capable learners.

....Students who use CAI become increasingly self-directed in their learning style. They become more responsible for their learning and less dependent upon teachers.

....Students who use CAI are able to identify for themselves specific skill areas in which they have improved as well as areas in which they need improvement.

....Students who use CAI can monitor their own scores and are able to see general progress.

This affective growth results in more rewarding learning experiences for students and helps to account for the improved cognitive growth and more regular attendance among CAI users.

After three years, it is possible to make some tentative conclusions about the long term effects of CAI use. Studies of those students who were members of the Experimental Group in both 1977/78 and 1978/79 indicate that the cognitive growth of these individuals remains roughly consistent, while their attendance increases.

It is also significant to look at the progress of those who have moved beyond the scope of CAI. Since February 1977, 110 different students with reading levels between third and seventh grade levels have been part of the Lab Experimental Group for one or more years. Of these students, sixty-one have passed the Minimum Competency Test, twenty-seven have moved into the High School Equivalency program, sixteen have taken the High School Equivalency test, and four former CAI Experimental Group students are presently attending college.

The Great Neck Adult Learning Centers has consistently made two recommendations designed to help Adult Basic Education programs utilize CAI more effectively and to make CAI suitable for a larger number of Adult Basic Education students.

> First, that the scope of the reading and language arts software program be expanded to the 9th grade level. The current 3rd to 7th grade program has proven to be too limited to meet the needs of some Adult Basic Education students. There is a tremendous need for a diagnostic/prescriptive CAI curriculum which would extend to and include the 9th grade reading level.

Second, that a "random access" type feature similar to that found in the arithmetic program be built into the reading and language arts courses. This feature would provide the instructor with the opportunity to select for each individual student the appropriate entry level, as well as the option of drilling in any particular skill area. At present, all students engaged in learning reading and language arts from the CAI system must begin at the most rudimentary level and then work their way up. This represents a poor use of time for adult students, many of whom have only limited amounts of time available for continuing their education. A "random access" capability would remedy this problem and very likely increase the amount of actual learning time spent on the system.

It is understood that the Great Neck Adult Learning Centers program will be receiving a new CAI curriculum and system for the 1979/80 year which incorporates these recommendations. With these modifications, CAI should be able to serve a greater number of students and do so more efficiently.

The introduction of Computer Assisted Instruction has greatly improved the quality of the educational program offered to Adult Basic Education students in the Great Neck Adult Learning Centers. It has been a great learning experience for both staff and students. Students utilizing CAI appear to become more self-directed in their learning style. They express more confidence in their ability to learn. They attend school more regularly. They show marked improvement in their reading and mathematics ability.

It is hoped that the experience of the Great Neck Adult Learning Centers will have meaningful implications for Adult Basic Education programs throughout New York State. Computer Assisted Instruction has proven itself worthy of continued exploration and expansion.

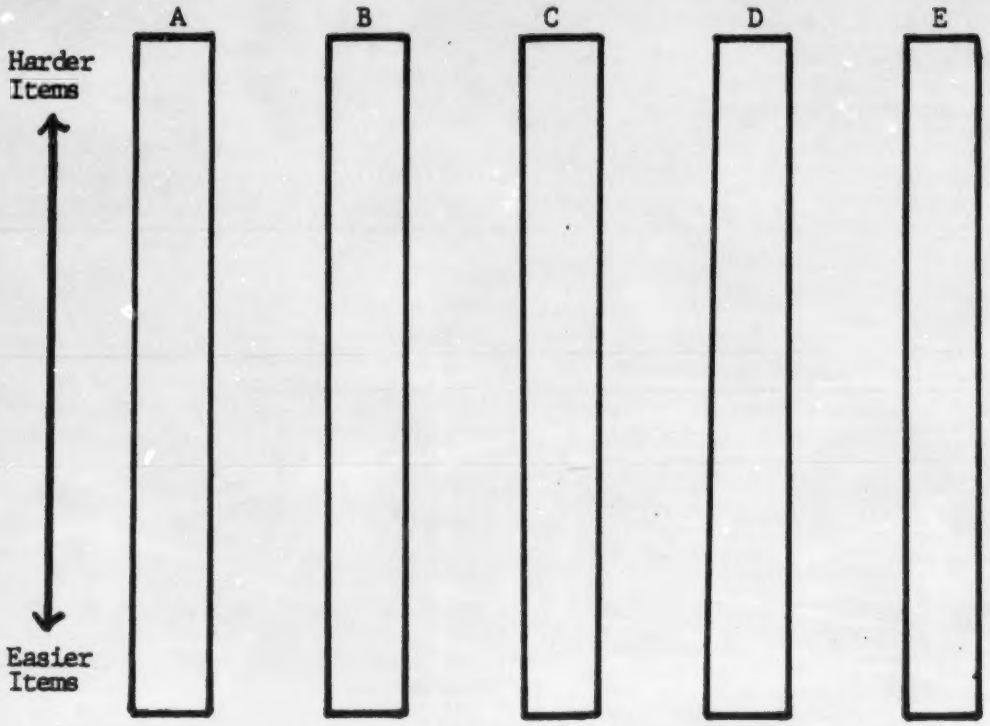
PART III

APPENDIX

APPENDIX #1

ADULT READING SKILLS

STRANDS



STRAND A - Word Attack

Suffixes, Prefixes, Root Words, Compounds, Contractions

STRAND B - Vocabulary

Vocabulary Study, Homonyms, Synonyms, Antonyms

STRAND C - Literal Comprehension

Categories, Transformations, Questions and Answers

STRAND D - Interpretive Comprehension

Fact and Opinion, Primary Inference, Character Study, Analogies, Slanted Writing, More Interesting Writing, Metaphor and Simile

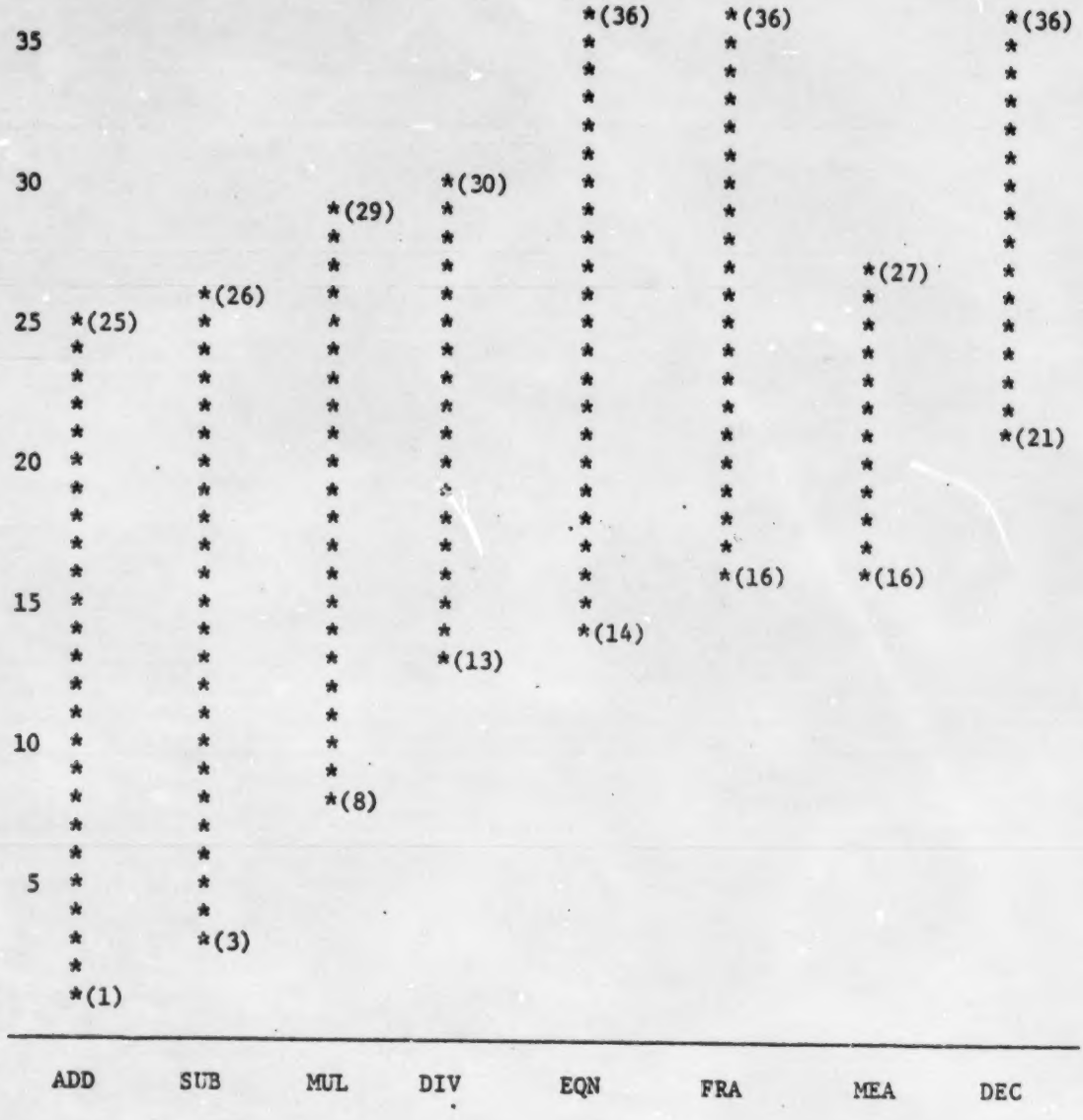
STRAND E - Work-Study Skills

Alphabetizing, Guide Words and Letters, Finding Information

APPENDIX #2

ADULT ARITHMETIC SKILLS

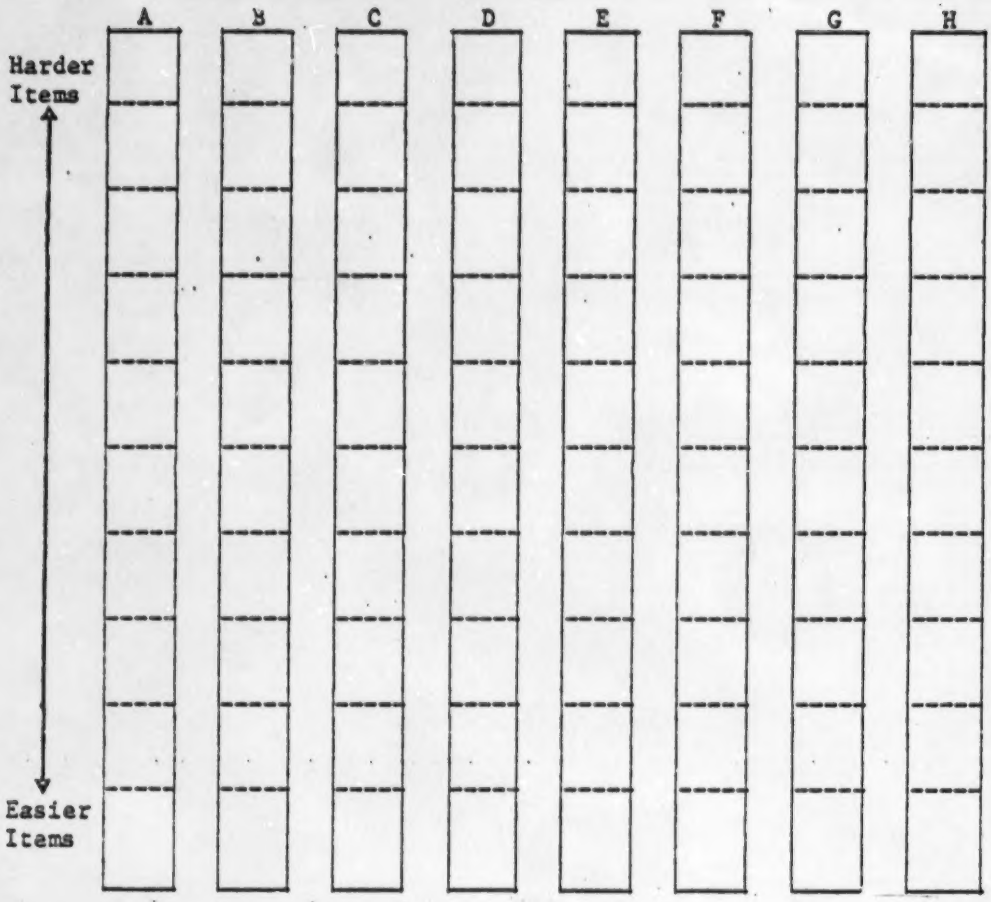
Curriculum Levels Defined for Each Strand



APPENDIX #3

ADULT LANGUAGE SKILLS

STRANDS



Strand A - Principal Parts of Verbs
Strand B - Verb Usage
Strand C - Subject-Verb Agreement
Strand D - Pronoun Usage
Strand E - Contractions, Possessives, and Negatives
Strand F - Modifiers
Strand G - Sentence Structure
Strand H - Mechanics
Strand T - Topics (a special strand that contains short lessons on the topics covered in the other strands)

A typical lesson is made up of a mixture of problems drawn from Strands A through H plus a short lesson from Strand T.

APPENDIX #4

OUTLINE OF DISCUSSION QUESTIONS

a) Do students enjoy using CAI?/find CAI helpful?

b) Are students able to see progress through the CAI program?

c) Are students (through using CAI) able to identify areas of need they had not recognized previously? If so, do they get help in those areas?

d) Are students (through using CAI) aware of improvements in specific skill areas they originally found difficult?

e) Does CAI have any impact on students' desire or ability to work independently?

f) Do students have any suggestions as to how CAI could be improved?

APPENDIX #5

SEMANTIC DIFFERENTIAL (ATTITUDINAL QUESTIONNAIRE)

INSTRUCTIONS FOR FILLING OUT ATTITUDINAL QUESTIONNAIRE

We are asking you to fill out this questionnaire so that we can get a better idea of how you feel about a number of school related topics. It is important that you complete each sentence by putting an "X" on the line that best describes how you <u>really</u> <u>feel</u> about what it says in the sentence. Please complete each sentence to the very best of your ability. Be sure to put an "X" on <u>each</u> scale in the questionnaire. Do not leave any scales out and do not put more than one "X" on any one scale.

<u>HERE IS HOW YOU ARE TO MARK YOUR QUESTIONNAIRE</u>

If you feel <u>very strongly</u> that grades on a test are unfair place an "X" on the line closest to unfair.

<u>Example:</u> Grades on a test are... fair ___ ___ ___ ___ "X" unfair
1 2 3 4 5

If you feel very strongly that grades on a test are fair place an "X" on the line closest to fair.

<u>Example:</u> Grades on a test are... fair "X" ___ ___ ___ ___ unfair
1 2 3 4 5

If you feel that grades on a test are fair but you <u>do not have very strong</u> feelings about them, <u>do not</u> place an "X" on the line closest to fair but do place an "X" on a line closer to fair than unfair.

<u>Example:</u> Grades on a test are... fair ___ "X" ___ ___ ___ unfair
1 2 3 4 5

If you feel that grades on a test are unfair but you <u>do not have very strong</u> feelings about them, do not place an "X" on the line closest to unfair but do place an "X" on a line closer to unfair than fair.

<u>Example:</u> Grades on a test are... fair ___ ___ ___ "X" ___ unfair
1 2 3 4 5

If you do not care one way or the other, place an "X" on the line halfway between the two ends.

<u>Example:</u> Grades on a test are... fair ___ ___ "X" ___ ___ unfair
1 2 3 4 5

Remember, it is important that you mark the answer that best describes how you feel (very strongly; not so strongly; don't care) by placing an "X" on the appropriate line. You should have 10 "X's" for sentence #1, 10 "X's"for sentence #2 and so on. Work as quickly as you can and do not spend too much time thinking about each scale. If you have any questions, please ask your teacher.

Adapted by John Caffera,
Great Neck Adult Learning Centers.

1. Learning with the help of a computer is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

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2. Coming to school to study is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

3. My progress, or the rate of speed, at which I learn is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

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4. Studying reading is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

5. Studying math is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

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6. Studying language is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

7. My teachers (in the Lab or classroom are...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

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8. Learning from books, workbooks, worksheets is...

1. good ___ ___ ___ ___ ___ bad
   1 2 3 4 5
2. wrong ___ ___ ___ ___ ___ right
   1 2 3 4 5
3. unhelpful ___ ___ ___ ___ ___ helpful
   1 2 3 4 5
4. enjoyable ___ ___ ___ ___ ___ unenjoyable
   1 2 3 4 5
5. easy ___ ___ ___ ___ ___ hard
   1 2 3 4 5
6. uncomfortable ___ ___ ___ ___ ___ comfortable
   1 2 3 4 5
7. important ___ ___ ___ ___ ___ unimportant
   1 2 3 4 5
8. kind ___ ___ ___ ___ ___ cruel
   1 2 3 4 5
9. beautiful ___ ___ ___ ___ ___ ugly
   1 2 3 4 5
10. dependent ___ ___ ___ ___ ___ independent
    1 2 3 4 5

9. Learning with the help of machines such as tape-recorders, cassettes, video tapes, controlled readers, Aud-X or language masters is...

1. good ___ ___ ___ ___ ___ bad (1 2 3 4 5)
2. wrong ___ ___ ___ ___ ___ right (1 2 3 4 5)
3. unhelpful ___ ___ ___ ___ ___ helpful (1 2 3 4 5)
4. enjoyable ___ ___ ___ ___ ___ unenjoyable (1 2 3 4 5)
5. easy ___ ___ ___ ___ ___ hard (1 2 3 4 5)
6. uncomfortable ___ ___ ___ ___ ___ comfortable (1 2 3 4 5)
7. important ___ ___ ___ ___ ___ unimportant (1 2 3 4 5)
8. kind ___ ___ ___ ___ ___ cruel (1 2 3 4 5)
9. beautiful ___ ___ ___ ___ ___ ugly (1 2 3 4 5)
10. dependent ___ ___ ___ ___ ___ independent (1 2 3 4 5)

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10. I see myself as...

1. good ___ ___ ___ ___ ___ bad (1 2 3 4 5)
2. wrong ___ ___ ___ ___ ___ right (1 2 3 4 5)
3. unhelpful ___ ___ ___ ___ ___ helpful (1 2 3 4 5)
4. enjoyable ___ ___ ___ ___ ___ unenjoyable (1 2 3 4 5)
5. easy ___ ___ ___ ___ ___ hard (1 2 3 4 5)
6. uncomfortable ___ ___ ___ ___ ___ comfortable (1 2 3 4 5)
7. important ___ ___ ___ ___ ___ unimportant (1 2 3 4 5)
8. kind ___ ___ ___ ___ ___ cruel (1 2 3 4 5)
9. beautiful ___ ___ ___ ___ ___ ugly (1 2 3 4 5)
10. dependent ___ ___ ___ ___ ___ independent (1 2 3 4 5)